BULLETIN

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Contribution to American Bryology—XI.

By Elizabeth G. Britton.

1. COSCINODON RAUI AND COSCINODON RENAULDI.

(Plate 248.)

Owing to the fact that the upper part of the leaf in *Coscinodon* is colorless, it has happened that in the first descriptions of both *C. Wrightii* and *C. Raui*, the vein has been described as ending below the apex. In describing *C. Wrightii* Sullivant said of the leaf that it was "costate half way" (Mosses U. S. 38. *pl. 4.* 1856). In the Icones (71. *pl. 45.* 1864), he corrected this mistake, figuring the vein extending into and forming the awn.

Austin made the same mistake about *C. Raui* (Bull. Torr. Bot. Club, **6**: 46. 1875), describing the leaf with the vein ending below the apex, "costa valida sub apice finienti," yet in the type specimens preserved in his herbarium at Columbia College, the vein is clearly excurrent, forming a terete, white awn, most clearly seen in old abraded leaves when the blade is torn away. He recognized its true character in *C. Wrightii*, for he says of it "costa extending into the much longer, more terete and more scabrous hair point;" yet he failed to see it in his own species. This is the more remarkable, as he had in his herbarium an original sketch of the leaves by E. A. Rau, on the margin of which Mr. Rau had written, "Leaves throughout chlorophyllose, except the long excurrent costa or tip."

In the Manual (L. & J. Mosses of N. Am. 155, 1884) this mis-

take is repeated and in describing *C. Renauldi* (Bot. Gaz. 15; 41. 1890) M. Cardot cites this as one of the points of difference between these two species, the other being a difference in the teeth. These are described in the Manual as "entire, split or merely perforated here and there on the line of division, erect when moist, open when dry." This is a translation from Austin's original Latin description, but it does not agree with all his specimens. The teeth are very fragile in his species, and are seldom seen entire and unbroken, except on a freshly opened capsule. They are long and slender, perforate at base, three to four parted above, and densely papillose; later they divide into slender divisions, and on old capsules have disappeared altogether, leaving only the annulus. As compared with the figures of *C. Renauldi*, they differ only in not being truncate when perfect. From *C. Wrightii*, as figured in the Icones, these teeth are much longer, more acuminate, the divisions narrower, more slender and regular, the perforations almost continuous above, and splitting into three to four slender divisions to each tooth. The annulus also is not like the mosaic of flat cells figured by Sullivant, there are only two rows of cells instead of three, and the last row has elongated vesicular cells. In the description of *C. Renauldi*, the annulus is not mentioned, nor is it figured in the plate. We have not seen a capsule of this species, but in a recent letter M. Cardot states that the annulus is present, but that he has not been able to determine whether it is persistent or fugacious as all the capsules which he has examined were too young. In the plate the teeth are figured as truncate. M. Cardot says that they were taken from freshly opened capsules, but we are of the opinion that if he were to search in the apex of the lid he would find the remnants of those teeth, as we have found in *C. Raui*, that the tips often fall with the lid, and it was with difficulty that we secured a mount sufficiently perfect for our drawing.

In the description of *C. Renauldi*, M. Cardot states that he has not seen authentic specimens of *C. Raui*, Aust., but this is a mistake, for the specimens I sent him were from Austin's herbarium, labelled Austin by "*Grimmia Raui*, Colorado, Mrs. Roy," and were probably from the same collection as those in the herbarium of E. A. Rau, collected by Brandegee sent by Mr. Rau. These

are the specimens cited by Cardot under *C. Renauldi*, and seem to prove conclusively that the two species are the same.

The specimens collected by J. M. Holzinger on exposed sand bluffs at Winona, Minnesota, have been determined by M. Cardot as *C. Renauldi*, and by me as *C. Rau*. We also have specimens collected by Mrs. T. A. Williams at Rapid City, South Dakota, which we have referred to this species.

The plate of *C. Rau* is taken from type specimens in Austin's herbarium sent to him by E. A. Rau, collected by Brandegee.

Description of Plate 248.

1. Plants natural size; 2. one enlarged; 3. antheridial branch; 4. archegonia branch with the calyptra partially exserted; 5, 6, 7. outlines of leaves; 8. antheridia and bracts; 9. basal half of leaf; 10. apex, showing long rough awn; 11. calyptra; 12. capsule with lid; 13. capsule without lid; 14. old capsule with fragments of teeth; 15. two teeth; 16. annulus; 17. spores.

2. DICRANELLA HETEROMALLA AND ITS VARIETIES.

(PLATE 249.)

According to European authorities this is a very variable species, several of its more striking varieties having received names. The typical form seems to be according to Schimper and Limpricht, the one having the pedicels erect but more or less sinuous. Braithwaite, however, states that the pedicels may be curved, and Boulay says that owing to the variability of the flexion of the pedicel at its summit the capsule assumes very diverse attitudes.

Several of the European varieties have been recognized and distributed in American exsiccatae; but we have been surprised to find that even in this common species there still remain some points to be cleared up, and possibly two allied species to be erased from our lists.

The common lowland form ranging along the Atlantic plain from Newfoundland to Florida, west to Dakota, which grows abundantly along sandy roads in dense cushions at the roots of trees and on dry banks, seems to be typical, having the seta erect, flexuose and glossy yellow, agreeing with European specimens and exsiccatae. It was distributed in Drummond's Mosses, 2d

Ed. No. 54, in Sulliv. & Lesq. Musci Bor. Am. No. 67, and Austin Musci App. No. 79.

DICRANELLA HETEROMALLA ORTHOCARPA (Hedw.).

Dicranum orthocarpum Hedw. Sp. Musc. 131. *pl. 30.* 1801.

Dicranella Fitzgeraldi Ren. & Card. Bot. Gaz. 13: 197. *pl. 13.* 1888.

This variety is not recognized as distinct by Limpricht, but is given as a synonym of the species, into which it merges insensibly, having the same range. The type locality was at Lancaster, Pennsylvania, but we have not seen the type specimens. The capsule, as the name implies, is not only erect but straight, in the most depauperate forms being so small and black as to suggest *Ditrichum tortile*. This is true of the specimens distributed in Drummond's Southern Mosses as No. 53, and in the original specimens of *D. Fitzgeraldi*, from Florida, as described and figured in the Gazette. M. Cardot has sent us four of these typical specimens; all are old and deoperculate, and represent, in our opinion, a very depauperate state of this variety. Quite recently we have received No. 156 of Ren. & Cardot Musci Am. Sept. collected by J. M. Holzinger at Rock Creek, near Washington, D. C. These specimens are in fine condition, and contradict the original description of *D. Fitzgeraldi* in several points, the old capsules when deoperculate being contracted below the mouth, which is slightly oblique; the walls also are often sulcate, so that we have no hesitation in saying that these are *D. heteromalla* var. *orthocarpa*. They agree with Sull. & Lesq. Musci Bor. Am. No. 68, and Austin Musci Ap. No. 80.

The variety *interrupta* Schimp. has also been recognized and distributed in American exsiccatae, and the var. *stricta* occurs abundantly on decomposing sandstone rocks in the Dells of the Wisconsin. Recently I have made the acquaintance of what may be called the mountain form of this species (Plate 249) for which we have not yet discovered a name, but which we think has been figuring in the Manual as *D. curvata*. It first puzzled me by growing in the dense mats of *Campylopus Virginicus* Aust., raising false hopes that it might be the fruit of this species, which has thus far only been collected sterile. The pedicels were strongly recurved, and the capsules when fresh, ovoid and smooth; but

when dried they changed to the characteristic cinnamon color of *Dicranella heteromalla*, with its twisted mouth and sulcate walls, and the pedicels became erect. These specimens grew at an elevation of 5678 ft. on the summit of White Top, Virginia, on rocky ledges in shade, and were in young fruiting stage on June 26, 1892. Later in the same year, September 29th, I collected a few small plants in the trail up Mt. Marcy, in the Adirondack Mountains, New York. These also were small plants, with plump, ovoid, green capsules and yellow curved seta. But when dried the pedicels became erect, the capsules turned yellow, and showed unmistakably that they were only *Dicranella heteromalla.* It was also found at other points in the vicinity, usually in shade under or on the roots of trees in steep, sloping paths, often in very damp, black soil. Along the roadside, near the Lodge, the pedicels were seldom recurved, though the plants were small. In 1894 the form with recurved pedicels was very abundant both on Mt. Marcy and Mt. McIntyre, and formed large patches at considerable elevation on both these mountains. I had also collected it near Stowe, Vermont, in 1884, and been puzzled by the straightening of the pedicel in drying. In 1893 it was found growing with *Dicranodontium longirostre* on shady sandstone ledges of the Wisconsin Dells, and it surprised me to learn from Dr. Barnes that it was the common form of *Dicranella heteromalla* in that vicinity. It has recently been sent to me by D. A. Burnett, collected in the mountains of Pennsylvania on sandstone rocks at Bradford, associated with *Dicranodontium longirostre*, and it was collected in similar habitat and the same association by Mr. D. A. Hopkins in West Virginia. We also have specimens collected by F. L. Harvey in Maine, by Edwin Faxon on the bridle path at 3,500 feet elevation and on the summit of Mt. Lafayette; also from the Lake of the Clouds on Mt. Washington. Pringle collected it on Mt. Mansfield, Vermont, and A. C. Waghorne in Newfoundland. I find three specimens collected by Austin in 1872 in the White Mountains, which had been sent to T. P. James for determination; accompanying them is an autograph slip from James stating that they "must be a *Dicranum*, but I do not make it *subulatum*."

Now it is a curious fact that *Dicranella curvata*, though reported from two stations in North America, does not occur in any

North American herbarium, as far as we can determine. We have searched diligently for it both in the field and in several collections, and have come to the conclusion that this mountain form of *D. heteromalla* with curved pedicels has been mistaken for it.

It is recorded in the Manual from two localities only:

"On sandstone rocks, Lancaster, Pennsylvania (T. C. Porter), and from the White Mountains (James). Very rare."

Dr. Porter very kindly sent us a bit of his specimen, and it does not match European specimens of *D. curvata*. It seems referable to depauperate specimens of *D. heteromalla* var. *orthocarpa*. The White Mountain specimens cited have not been found in the herbarium of T. P. James. Macoun does not record it from any locality in Canada, nor have we any other record of its having been collected by anyone else.

3. NOTES ON THE GENUS LEERSIA, HEDW.

LEERSIA Hedw. Fund. Musc. 2: 88. 1782.

ENCALYPTA Schreb. Gen. 2: 759. 1791.

This genus is much in need of revision, but we have not been able to take the time to do more than set right two or three glaring mistakes which have come to our notice, in studying the Eastern species, and to call attention to collectors in our Western and Northern States to the importance of securing good and abundant specimens.

There are five species known to occur in the eastern part of the continent, *L. extinctoria* (*E. vulgaris*) *L. laciniata* (*E. ciliata*) *L. rhabdocarpa*, *L. procera* and *L. contorta* (*E. streptocarpa*). One of the Eastern species *L. rhabdocarpa* has been found in Quebec, but not yet credited to the United States, it is hoped that it will be found in the mountains of New England if attention is called to the genus.

Of the additions in Macoun's catalogue, *E. subspathulata*, *E. leiomitra*, *E. leiocarpa* and *E. cucullata* are from British Columbia, or Athabasca, and although Prof. Macoun has generously furnished us with all his collection of this genus, and allowed us to keep duplicates, yet we have not felt warranted in taking the time at present to compare the specimens carefully. We have thought it

very important, however, to correct Kindberg's confusing remarks regarding *E. Macounii* Aust. and *E. ciliata* Hedw.

ENCALYPTA MACOUNII AUST. Bot. Gaz. 2: 97. 1877. L. & J. Man. 182, 1884. Macoun's Cat. 6: 94-95 only in part (1892).

The type of this species is preserved in Austin's Herbarium at Columbia College. The specimens are abundant though immature. They have been compared with the original description, which is copied in Lesquereux and James Manual. All the statements but one have been verified; the seta is described as "minutely papillose, rather densely so above the middle." They have been examined with a magnification of 330 diameters, and out of a dozen pedicels on none of them has been found a trace of roughness.

Austin compared it to *E. affinis* Hedw. (*E. apophysata*, N. & H.). We have also made the same comparison with No. 816 of Rabenhorst's Bryotheca Europaea, and find that Austin was right. The calyptra agrees exactly in having pale irregular papillae to the fringed base, though we should call it rather minutely scabrous than "densely papillose." But the leaf characters are also very plain, the margins being strongly revolute, the vein ending below the apex, and very rough on the back with double papillae; the basal cells are clear with the short transverse walls, yellow and thickened into ridges and also papillose. This is true also of *E. affinis*, but the vein in that species is excurrent into an awn. The peristome is described by Austin as "single, the teeth of medium length, very narrow and filiform, red, more or less split into two equal segments, nodulose and granulose." This agrees with the figures of *E. apophysata* in the Bryologia Europaea, but Limpricht says the peristome is double and has a short basal membrane, one-third the length of the teeth, which he figures as 247, page 118. We have been able to detect this in No. 816 of Rab. Byoth. Eu. even when the peristome is old, but not in Austin's specimens. This would add another distinction between *E. apophysata* and *E. Macounii*, though they are evidently closely allied.

The type locality is "On rocks, Stewart's Lake Mountain, B. C., collected by Macoun, June 21, 1875.

On consulting Macoun's Catalogue, I find this locality is not given the first place as it should be, and that the specimens sent

by me from Mount Mackay and Kakabeka Falls, named *E. ciliata*, duplicates of which I have in my herbarium, are also referred to this species. I have re-examined them lately, and still insist that the name I originally gave them is correct. Number 133 of Macoun's Canadian Mosses was distributed as *E. Macounii*, collected "on rocks at Wellington Mine," Vancouver Island, by Macoun. These specimens in our set prove to be *Encalypta vulgaris* var. *pilifera*. If these are the specimens on which Kindberg bases his remarks, it is not surprising that he could not find the characters indicated by Austin.

Under the heading of *E. ciliata* he says (Macoun Cat. 6: 94): "*Encalypta ciliata* Hedw. and *E. Macounii* Aust. are very difficult to distinguish apart. The descriptions of the best authors are also not consistent." He then quotes from them to show that the position of the teeth does not agree in all the descriptions. From this he says: "It is probable that the authors are confounding both species, also occurring in Europe. *E. ciliata* is principally found in the lower mountain districts. *E. Macounii* seems to be an alpine species also collected by Kindberg in the Norwegian Alps and considered a new species, *E. borealis* Kindb. Laubm. Schwed. & Norweg., but exactly agreeing with the original specimens of *E. Macounii* sent by Prof. Macoun."

It is interesting to know what Norwegian bryologists think about this, and we would refer to the remarks by Chr. Kaurin in the Bot. Centbl. 41: 358 (1890). He states that in the contribution referred to by Kindberg the specimens which were called *Encalypta Macounii* are found to differ from the portion of the type which I sent him.

To continue the quotation from Macoun's Catalogue, page 95:

"The description made by Austin, cited by Lesq. & James, is, however, not completely exact; 'calyptra densely papillose, pedicel reddish, papillose, the leaves muticous;' such characters are not to be found, the calyptra and the yellow pedicel are nearly as smooth as in the true *E. ciliata*, to which the descriptions of the peristome by Schimper and Braithwaite probably belong. The descriptions by Lesq. & James and Boulay could partly be referred to *E. Macounii*, although all authors agree that in the description of *E. ciliata*, 'without a distinct collum;' *E. Macounii* has a distinct collum and the margins of the leaves distinctly reflexed. I possess no specimens of the true *E. ciliata* from North America. It may not occur there."

Now it seems evident from all this that Macoun has sent Kind-

berg a specimen of *Encalypta* closely allied to *E. ciliata*, wrongly named *E. Macounii*, and from this false premise he has arrived at the above conclusions. Whether all the specimens cited in Macoun's Catalogue as *E. Macounii* were sent to Kindberg is not clear, but probably this is not the case. It is likely that only a few of them were, and that the rest have been transferred without examination by Prof. Macoun in making up the list.

We note one that was not transferred, for No. 132 Canadian Mosses is cited under *E. ciliata*, with the label locality reading: "Crevices of rocks, common from Ottawa westward." These specimens have been examined and compared with the types of *E. Macounii*. They are quite distinct in the excurrent vein, plane margins, smooth calyptra, and the mouth bordered by 5–6 rows of hexagonal cells projecting above the base of the teeth. We have also examined all the other specimens in Austin's herbarium sent to him by Macoun and named by Austin *E. ciliata*. These include specimens collected at Stewart's Lake, date and locality the same as type of *E. Macounii*, but distinctly *E. ciliata;* also those from Lake Athabasca, August 29, 1875; Cascades, May 17, 1875; and Hastings county, August, 1874. All of these agree with the characters of *E. ciliata* as described by Limpricht, even to the size of the spores, but in many cases it is difficult to distinguish the preperistome as described by him. The deep projecting border of the mouth is quite distinct, as well as the scattered stomata, with the surrounding cells not differentiated, but long and thickened longitudinally. The neck also is short, but always distinct, and sometimes stomatose, though usually the stomata are above the base of the sporesac.

ENCALYPTA CILIATA (Hedw.) Hoffm.

We find in the Jaeger Herbarium all the exsiccatae cited by Limpricht, and have critically compared No. 19 of his Bryotheca Silesiaca, with our specimens of Macoun's Canadian Mosses No. 132. and Sull. & Lesq. Musci bor. Am. No. 165, Ed. 2. We find they agree in all the characters described, with a certain amount of variation in the length of the awn, and the vein which is also sometimes serrulate on the back for a short distance below the apex of the leaf; the margins are more or less undulate and slightly revolute below, erose papillose above, and the basal cells

are clear and smooth, with the short transverse walls often brown but not projecting. The seta varies somewhat in length, but is smooth and yellow, often red at the junction with the capsule; there is a distinct neck measuring .2 mm., that is the sporesac does not reach the base of the capsule, the stomata are scattered above its base, and the cells of the walls are long and thickened, but not radiating around the stomata; those of the mouth are shorter and hexagonal in 5–6 rows, and project above the base of the orange-red teeth, the last rows falling in fragments with the lid. The beak of the lid is shorter than the capsule, 1–1.5 mm. and the calyptra is fringed at base and generally entirely smooth, though occasionally scabrous at apex. The peristome is erect when dry, and strongly incurved when moist; the teeth are composed of 5–7 joints, and are paler and smoother at apex. Limpricht describes a " preperistome of 32 isolated, smaller, brownish-red plates half the length of the teeth, falling off, or occasionally lacking." We have had great difficulty in distinguishing these plates, both in our specimens and the Europeon ones, but find the teeth are irregularly papillose, that is some joints will be and others not, especially the upper ones, which are generally lighter colored, and presume that is only under very favorable circumstances, on fresh young teeth, that the preperistome can be seen. The Bryologia Europaea indicates this in figures 14 and 15, as well as a certain amount of irregularity in the teeth which we have also observed. The spores are quite alike in American and European specimens, in size and the peculiar lines due to shrinking which give them the aspect of a rose-cut diamond with a flat central facet and six radiating around it.

If there are two species mixed under *Encalypta ciliata*, as Kindberg seem to think, we have not yet been able to detect it in American specimens, as compared with authenticated European ones. It has been distributed as Drummond's No. 50 pp. " Rocks and banks along the Mountains," mixed with *E. rhabdocarpa* in Sull. & Lesq. Musci Bor. Am. Ed. 2, No. 165, in Austin's Musci App. No. 174 (1870) and Macoun's Canadian Mosses No. 132. It ranges in the Eastern States from the mountains of New York and New England to Illinois, Wisconsin and Minnesota, Ontario, Quebec, New Brunswick, and north to Greenland. In the

Rocky Mountains from New Mexico to Idaho, also in California, Oregon and Washington, through British Columbia, to Behring sea.

Var. *microstoma* (Bals. & DeNot.) Sch. Br. Eu. Index, p. 7. 1855. *Encalypta microstoma* Bals. & DeNot. Pugill. No. 18. 1836.

We received from the Department of Agriculture specimens collected by Wolf and Rothrock in Colorado, 1873, which agree with the description given by Limpricht of this variety in the short seta, small capsule, with a small mouth, short teeth, lacking on some of the capsules, and the cells of the walls broader and much thickened, with very distinct stomata. The spores, however, seem to be smooth as in the species.

ENCALYPTA LONGIPES Mitt. Journ. Linn. Soc. **8**: 29. 1865.

We quote the original description:

Dioica? caule brevi ramoso, foliis patentis concavis ambitulate ellipticis acutis paulo supra basin angustatis nervo percurrento obtuse carinatis, margine minute eroso, cellulis basi infima oblongis hyalinis inde viridibus mox abbreviatis quadrato-rotundatis papillosis, perichaetialibus parvis vaginulam vix superantibus latissime ovatis acutis theca in pedunculo longissimo rubro ovato-cylindracea basi apophysata, operculo subulato subaequilongo-peristomo dentibus angustis elongatis, calyptra basi nuda apice laevi."

"Seta an inch and a half long, slightly flexuose. Capsule too immature to show if it is furrowed."

Lesquereux and James, in their Manual, on page 183, say in a foot note:

"Upon examination of the specimens of *E. longipes* Mitt. in all of Drummond's sets the characters have been found identical with those of *E. procera;* the plants monoecious; the calyptra papillose, its borders emarginate, erose or fimbriate at base; perichaetial leaves piliferous; capsule spirally striate, etc. The differences that appear in the characters indicated by Mitten result from the unripeness of the specimens he had for examination."

We were permitted by Dr. Watson to examine the type of this species at the time that Mitten's types were still at Cambridge, and we have compared them with the original description and with the above remarks. We can corroborate Mitten's statements, with additional evidence that this is not the same species as *E. procera.*

The calyptra is smooth throughout, and so is the vein of the narrow leaf, which, moreover, as the description says, has a

minutely erose margin, formed of projecting cells which appear smooth, not densely papillose as in *E. procera*. The upper cells of the leaf, in fact, are not papillose but mamillate, projecting on both surfaces of the apex of the leaf, but slightly. Not only is the peristome also described as simple, but a drawing is preserved with the type, showing a single row of teeth, with 2–3 appendiculate basal segments. Kindberg in Macoun's Catalogue says that he too has seen authentic specimens of Drummond's in the collection of Dr. C. Mueller, and states that the "costa is very rough, the calyptra regularly laciniate, very rough and subspinulose above."

It is evident from these remarks, however, that the specimens could not have been authentic, for this is a direct contradiction of the original description, verified by a reëxamination of the type specimen.

We do not like to venture an opinion without careful comparisons, especially as this species is so meagrely represented in the type, which is also immature, so that it is rather unsatisfactory for purposes of comparison; yet it seems to be very closely related to *E. leiomitra* Kindb., belonging to the group of *E. rhabdocarpa* Schwaeg., from which it differs presumably in its smooth capsule (?), although the original description states that the specimens are too young to show this character.

Two undescribed Species of Rhynchosia.

By Anna Murray Vail.

Rhynchosia Michauxii.

Perennial. Stems prostrate 6–9 dm. or more long, twining above, angled, channelled, clothed, especially on the angles, with a short matted pubescence; stipules 2–5 mm. long, ovate-lanceolate, spreading, persistent; petioles angled, striate, pubescent, 2–4 cm. long, leaves 2.5–5 cm. long, depressed orbicular, much dilated, broader than long, obtuse, sometimes obscurely mucronulate, rugose and minutely hirsute above, sparingly resinous-dotted, reticulated and softly hirsute beneath; the upper ones rarely 3-foliolate with obtuse obliquely sub-orbicular lateral leaflets; racemes 1–several flowered; peduncles 1–2.5 cm. long, angled; calyx 1–1.5 cm. long, pubescent, resinous-dotted, the oblong-lanceolate acuminate

lobes conspicuously foliaceous; corolla pale yellow; vexillum minutely pubescent above; legume about 1.4 cm. long, 6 mm. broad, obliquely acute, seed 2–5 mm. in diameter, red-brown. March–September.

Dry pine barrens, Florida.

Charlotte Harbor, Blodgett; Tampa, A. H. Curtiss, No. 659; DeLand, Hulst; Sanford, Lake Co., G. V. Nash, No. 2314, in Herb. Columbia College.

A species with the leaf-form of *R. simplicifolia*, but the habit of *R. menispermoidea*. It has passed under the above names and also under that of *R. tomentosa* var. *volubilis*, but is very distinct from all forms of the type of the latter species. The lateral leaflets of *R. tomentosa* are always acutish, those of *R. Michauxii* being obtuse and rounded. The leaves are largerthan those of *R. menispermoidea*, less conspicuously veined, and apparently never cordate, the flowers more numerous, the calyx larger and more distinctly foliaceous.

Rhynchosia Torreyi.

Rhynchosia latifolia β Torr. & Gray, Fl. N. Am. 1: 285. 1838.

Perennial. Stems slender, branched, prostrate, spreading and and possibly twining, angled, obscurely striate, minutely pubescent; stipules 4–6 mm. long, lanceolate, slender, caducous; petioles angled, channelled, minutely pubescent, 3–5 cm. long; leaves 6–10 cm. long, 3-foliolate; leaflets 2.5–3.5 cm. long, orbicular-obovate or oblong-obovate, obtuse with a short abrupt acumination, narrowed at the base, minutely and sparingly pubescent on both surfaces, or nearly glabrous, beset with scattered resinous dots beneath, the terminal ones larger, the others inequilateral; racemes 5–8 cm. long, slender, the flowers scattered; flowers about 1 cm. long; calyx 8–10 mm. long, pubescent, resinous-dotted, the upper lobe 2-toothed, the middle lower one slightly the longest; vexillum nearly orbicular, 8 mm. long, pubescent along the top on the outer surface, with a very small crescent shaped callosity above the claw. Legume not seen.

Original locality. Sand Hill, Texas, Leavenworth. Type in Herb. Columbia College.

Flora of Richmond Co., N. Y. Additions and new Localities, 1891–1895.

APPENDIX, No. 7.

Ranunculus Pennsylvanicus L. New Dorp, A. A. Tyler.

Aquilegia Canadensis L. Tottenville and Richmond Valley, Wm. T. Davis and G. H. Pepper.

Nymphaea rubrodisca (Morong) Greene. Bull's Head, J. V. Leng.

Roripa sylvestris (L.) Bess. Sailors' Snug Harbor, Dr. F. Hollick.

Silene nutans L. Arrochar, W. C. Kerr.

Silene vulgaris (Moench) Garcke. Tottenville, W. T. Davis.

Tilia Americana L. Willow Brook and New Springville, W. T. Davis.

Acer Saccharum Marsh. Moravian Cemetery and New Springville, Wm. T. Davis.

Acer platanoides L. New Brighton and Todt Hill, Wm. T. Davis.

Acer Negundo L. Port Richmond.

Medicago sativa L. New Brighton, W. T. Davis; Princes' Bay.

Coronilla varia L. Tottenville, W. T. Davis.

Ulex Europaeus L. Ward's Hill, Tompkinsville, Dr. F. Hollick. (A single plant which has persisted for several years).

Amorpha fruticosa L. Egbertville, W. T. Davis.

Phaseolus polystachyus (L.) B.S.P. Egbertville, W. T. Davis.

Opulaster opulifolius (L.) Kuntze. Todt Hill, W. T. Davis; Willow Brook (some undoubtedly seedlings).

Rubus odoratus L. Todt Hill, W. T. Davis.

Crataegus coccinea L. Karle's Neck, W. T. Davis.

Crataegus punctata Jacq. West New Brighton.

Agrimonia mollis (T. & G.) Britton, and *Agrimonia striata* Michx., replace *A. Eupatoria* L. in our catalogue.

Valeriana officinalis L. Gifford's Lane (Replaces *V. sylvatica* Banks, in our catalogue).

Onagra Oakesiana (Gray) Britton. New Dorp.

Æthusa Cynapium L. Streets of New Brighton, W. T. Davis.

Anthriscus vulgaris (L.) Hoffm. New Dorp.

Philadelphus coronarius L. Todt Hill, W. T. Davis (apparently established from old garden waste).

Solidago Elliottii T. & G. Garrettsons and New Dorp.

Solidago patula Muhl. Garrettsons and Richmond, W. T. Davis.

Gnaphalium purpureum L. Egbertville.

Tussilago Farfara L. Garrettsons.

Liatris spicata (L.) Nutt. Mariners' Harbor, W. T. Davis.

Sericocarpus linifolius (L.) B.S.P. Watchogue, W. T. Davis.

Centaurea nigra L. Moravian Cemetery.

Onopordon Acanthium L. Sailors' Snug Harbor, Dr. F. Hollick.

Schollera macrocarpa (Ait.) Britton. Tottenville, W. T. Davis; New Dorp, Mrs. N. L. Britton; Kreischerville.

Azalea viscosa rosea Hollick. Arlington, W. T. Davis.

Gaultheria procumbens L. Giffords.

Kalmia angustifolia L. Bogardus' Corners.

Pyrola secunda L. Bogardus' Corners.

Fraxinus viridis Michx. f. Clifton and New Dorp.

Cynoglossum officinale L. Arlington, W. T. Davis.

Convolvulus Sepium repens (L.) Gray. Oakwood.

Ipomoea pandurata (L.) Meyer. Mariners' Harbor, W. T. Davis.

Gerardia purpurea paupercula Gray. New Dorp.

Veronica Anagallis-aquatica L. New Brighton, Dr. F. Hollick.

Pentstemon Digitalis (Sweet) Nutt. New Dorp, Mrs. N. L. Britton; West New Brighton, T. C. Leng.

Stachys cordata Ridd. Eltingville, W. T. Davis.

Mentha gentilis L. Egbertville, A. A. Tyler.

Mentha sativa L. New Dorp.

Mentha citrata Ehrh. Richmond Valley.

Conopholis Americana (L. F.) Wallr. Todt Hill, Mr. Stottler.

Plantago aristata Michx. St. George, in recently filled-in ground.

Brousonnetia papyrifera Vent. West New Brighton, Mariners' Harbor and Richmond, W. T. Davis.

Alnus glutinosa Willd. Egbertville, W. T. Davis (A number of trees, thoroughly naturalized and apparently spreading).

Alnus incana (L.) Willd. Grant City.

Quercus Brittoni Davis. Watchogue.

Salix fragilis latifolia And. Todt Hill.

Populus heterophylla L. Huguenot, W. T. Davis.

Tipularia unifolia (Muhl.) B. S. P. Tottenville.

Calopogon pulchellus R. Br. Watchogue, C. W. Leng.

Habenaria blephariglottis (Willd.) Torr. Watchogue, W. T. Davis.

Cypripedium acaule Ait. An albino form. Mrs. Heylyn.

Tradescantia Virginica L. Arlington, W. T. Davis.

Wolffia Columbiana Karst. Old Town Pond, Thos. Craig.

Potamogeton Spirillus Tuckm. Court House, Mrs. N. L. Britton.

Udora Canadensis Michx. Clove Lake, W. T. Davis.

Pinus echinata Mill. Linoleumville and not uncommon along the south side, W. T. Davis. Arrochar and Four Corners.

Eriophorum Virginicum L. Tottenville, W. T. Davis; Gifford's Mr. Twiggs.

Panicum pubescens Lam. Richmond Valley.

Panicum microcarpon Muhl. Tottenville.

Panicum commutatum Schultes. Richmond Valley.

Panicum verrucosum Muhl. New Dorp, A. A. Tyler.

Carex tenera Dewey. New Dorp, A. A. Tyler.

Carex muricata L. New Dorp.

Carex Muhlenbergii Schk. Abundant at Richmond Valley.

Carex tribuloides Wahl. Tottenville and Grant City; A. A. Tyler.

Dryopteris cristata (L.) Gray. Oakwood, Mrs. N. L. Britton. Mariners' Harber.

Azolla Caroliniana Willd. Clove Valley, Thos. Craig. (Introduced some years ago by Mr. Samuel Henshaw.)

Salvinia natans (L.) All. Silver Lake and in a small pond on Ocean Terrace, Thos. Craig. (Probably introduced.)

ARTHUR HOLLICK,
N. L. BRITTON.

New or Noteworthy American Grasses.—II.

By Geo. V. Nash.

Sporobolus asper (Michx.) Kunth. Enum. 1: 210. 1833.

Agrostis aspera Michx. Fl. Bor. Am. 1: 52. 1803.

Vilfa Drummondii Trin. Mem. Acad. St. Petersb. (VI.) Sc. Nat. 4: Botanique, 106. 1845.

Sporobolus asper var. *Drummondii* Vasey, Contr. U. S. Natl. Herb. 3: 60. 1892.

This grass and the next seem to have been confused. The plant named *S. asper* by Dr. Vasey is the *Agrostis longifolia* Torr., and not the *A. aspera* of Michaux, who apparently had in mind, so far as can be determined from his short description, the form with a long palet. The plant of Michaux, as here understood, has a long-acuminate, sometimes almost awned, palet, which usually much exceeds the scale; the outer scales narrow and acute; the culm and panicle, which is generally exserted, quite slender.

Grows from Delaware to Illinois and Missouri, south to Florida and Texas.

Vilfa Drummondii Trin. may eventually be separated as distinct, but at present it seems preferable to refer it to this species, intermediate forms being very numerous and apparently connecting the two.

Sporobolus longifolius (Torr.) Wood, Class-book, 775. 1861.

Agrostis involuta Muhl. Gram. 72. 1817. Not Poir. 1810.

Agrostis longifolia Torr. Fl. 90. 1824.

Vilfa Hookeri Trin. Mem. Acad. St. Petersb. (VI.) Sc. Nat. 4: Botanique, 106. 1845.

Sporobolus asper Vasey, Contr. U. S. Natl. Herb. 3: 59. 1892. Not Kunth. 1833.

This is usually a more robust plant than the preceding. The panicle is generally more or less included in the upper sheath, sometimes merely protruding from the sheath fissure. The spikelets are wider, with broad, obtuse scales and palet, the latter about equalling the third scale.

Occurs from Maine to Illinois and Kansas, south to Long Island, Tennessee, Mississippi and Texas.

SPOROBOLUS VAGINAEFLORUS (Torr.) Wood, Classbook, 775. 1861.

Vilfa vaginaeflora Torr. A. Gray, Gram. & Cyp. No. 3. 1834.

Sporobolus minor Vasey; Wats. & Coult. in A. Gray, Man. Ed. 6, 646. 1890. Not Kunth 1833.

Sporobolus filiculmis L. H. Dewey, Contr. U. S. Natl. Herb. 2: 519. 1894.

The type of this plant, as indicated in A. Gray, Gram. & Cyp., is the form with long and narrow spikelets, the scales narrow and acuminate. Dr. Vasey took up and named as *S. vaginaeflorus* the form with shorter and broad spikelets, the scales merely acute. This plant is considered below.

SPOROBOLUS NEGLECTUS nom. nov.

Sporobolus vaginaeflorus Vasey, Wats. & Coult. in A. Gray, Man. Ed. 6, 645. 1890. Not Wood. 1861.

This is the plant that has long passed as *Vilfa vaginaeflora* Torr., but it is not the same, as indicated under the preceding species. Owing to this mistaken identity this plant appears to be without a name, and so the one given above is proposed. The broader and shorter spikelets, with the scales broad and merely acute, will readily separate this plant from the *S. vaginaeflorus* Wood.

In the vicinity of New York it is much less common than *S. vaginaeflorus*, which grows plentifully in many localities.

Dry sandy soil, Massachusetts to Kentucky, Tennessee and Kansas.

SPOROBOLUS BREVIFOLIUS (Nutt.) Scribn. Mem. Torr. Bot. Club. 5: 39. In part. 1894.

Agrostis brevifolia Nutt. Gen. 1: 44. 1818.

There seems to be much confusion in regard to *Sporobolus depauperatus* and *S. cuspidatus*. Forms of what appears to be a good species have been variously referred to either of the above. They agree well with the description of *Agrostis brevifolia* Nutt., and they are here referred to that species. The leaves are short, 1′–2′ long; the empty scales obtuse or merely abruptly acute, less than one-half as long as the acuminate and sometimes short-cuspidate flowering scale.

Grows from Anticosti Island and Maine to British Columbia, south in the mountains to New Mexico and California.

S. depauperatus (Torr.) Scribn. is a plant of the extreme northwest, occurring in Washington and Oregon, possibly extending southward in the mountains. The culms are short and decumbent, the internodes very short, usually ½′ long or less, the nodes often swollen; the empty scales broad, thin, white, delicate in texture, obtuse or acutish, more than one-half the length of the broad flowering scale, sometimes about equalling it.

In *S. cuspidatus* (Torr.) Wood the empty scales are acuminate and short-awned, more than one-half as long as the acuminate and awn-pointed narrow flowering scale. The plant is usually taller and has much longer leaves than either of the two species above mentioned, and ranges from Manitoba to the Northwest Territory, Missouri and Kansas.

ERAGROSTIS TRICHODES (Nutt.).

Poa trichodes Nutt. Trans. Am. Phil. Soc. 5: 146. 1833–37.

Eragrostis Geyeri Steud. Syn. Gram. 272. 1855.

Eragrostis tenuis A. Gray, Man. Ed. 5, 632. 1867. Not Steud. 1855, nor *Poa tenuis* Ell. 1817.

Nuttall's name for this plant is the oldest, and is here taken up. This grass extends from Illinois westward and southwestward, and is not known to occur in South Carolina or Georgia, the region covered by Elliott's Botany. It could hardly, therefore, be the same as the *Poa tenuis* of that work, which, according to a specimen of that plant in the Columbia College Herbarium, labeled as coming from Elliott, is apparently the same as the grass now known as *Eragrostis capillaris* Nees, and which well accords with the description given by Elliott of his *Poa tenuis*.

POA BUCKLEYANA nom. nov.

Poa tenuifolia Buckley, Proc. Acad. Phila. 1862: 96. 1862. Not A. Rich. 1851.

No other name for this plant can be found, and so the above is given it in honor of Dr. S. B. Buckley, who first published a description of it.

Vegetable Spiralism.

By George Macloskie.

My paper on Antidromy* attempted to show that every phenogamic plant produces two kinds of seeds, having their embryos turning in opposite directions, according to the side of the carpellary leaf on which they originated; also that the forthcoming plants have a primitive twist in opposite directions, showing itself in the histology of the stem, the dextrorse or sinistrorse phyllotaxy and anthotaxy, and in some cases in the structure of the carpels. The statement that the grains of Maize produce dextrorse or sinistrorse plants, according to the orthostichy of the ear in which they were produced, depended on hasty dissection; and although it seemed at first to be confirmed by the seedlings raised from the grains, I now find that there is no apparent constancy in this matter. My last experiment included nineteen seedlings grown from twenty grains taken in order from one of the paired rows in an ear (the row opposite my left hand) giving Nos. 1, 2, 3, 6, 8, 9, 10, 12, 15, 17, 20 with sinistrally overlapping leaves (Sc. the 1st leaf above the pileolus having its left margin external), and Nos. 4, 5, 7, 11, 13, 14, 18, 19 with dextrally overlapping leaves (No. 16 being abortive): thus giving eleven of one kind against eight of the other kind. In the grains from another homologous row, this proportion was nearly reversed. It is therefore necessary for the present to regard the beautiful symmetry of the ear of Maize (more beautiful in its early development than in its maturity) as a rearrangement of members at first as promiscuously arranged as are the staminate flowers of its panicle.†

Besides cases previously cited we have significant examples of antidromy in the seeds of *Salsola* (figured in Engler and Prantl, 3: 1a, 84. *Y*, *Z*), in the spirals of the Screw-pines, in the florets on the large head of the Sunflower and other large Compositae, which concur with the phyllotaxy, and even in the sword-like leaves of *Acorus Calamus*, those of one plant being dextrorsely

*Bulletin, 22: 379. Correct *erratum*, p. 380, three lines from foot, "distichous," so as to read "tristichous."

†I am obliged to the eminent agrostologist, Prof. W. J. Beal, for friendly criticism on this point.

twisted, and of another plant sinistrorsely. All the long leaves of all plants of *Typha* (both species) have a sinistral twist, in this showing no antidromy; but the mode of overlapping of the margins of their leaves near the nodes, which is the same for all the leaves of one plant, is contrary as between different plants. If this is a case of genuine antidromy, it is an argument against the view that the ovules of Typha arise terminally on the floral axis, a view which on other grounds has been doubted.

In the somewhat decussate leaves of *Paulownia*, and of the shaded branches of *Forsythia*, we can trace a spiral twist by following any one of the leaf orthostichies (they twist all in one direction about Princeton, where the plants are not propagated from seeds). But the branches of *Forsythia* when exposed to the sunlight lose their decussation and have all their leaves in two horizontal rows, thus demonstrating the controlling influence of the light. I believe that in a similar way many of our plants, as Elm, Beech and Morning-glory, have sacrificed their primitive phyllotaxy to the allurements of sunshine.

The Coniferae furnish an example showing how growth may supersede or even reverse the primitive order of parts. The young cones of *Picea*, *Tsuga* and other trees have the same spiral caste as the phyllotaxy, when we estimate their spirality by taking the longer of the two dominant curves as we do for the phyllotaxy. But after the cones open to give exit to the seeds, there comes a displacement of the scales, producing a false spirality in the contrary direction; thus the same tree, or even the two sides of a half-opened cone may present a quasi-antidromy. This may possibly be the explanation of published observations as to Conifers having antidromic cones on the same tree.*

The cases of *Arum*, *Iris* and *Juncus* were previously referred to as giving antidromic plants produced not by seeds but by division of the same rootstalk. A more curious case of diversity within the same plant is that of Bilsted (*Liquidambar Styraciflua*), which is cited in books as having opposite spirals in stem and branches. Every branch of this tree is true to its own phyllotaxy, with a $\frac{2}{5}$ divergence, dextrorse or sinistrorse for each, and this persisting through the annual innovations, whose crowded scale-scars

* *American Naturalist*, August, 1873.

are true to their phyllotaxy. In the horizontal members even the ridges of cork partially conform to the phyllotaxy of the particular member by a slight flexure to one side or the other. But the branches from the stem, or the branches from a branch do not necessarily conform to the phyllotaxy of the part from which they diverge; some of the daughter-branches may be homodromic, others heterodromic, as compared with the mother-branch, nor have I been able to discover any law in the case.

Perhaps these instances may favor the view that what we have in antidromy is not so much a special kind of heredity as an impulse depending on physical or nutritional causes, giving a bias to the young embryo or the young bud, which when once received is maintained. But whatever be the explanation offered, the facts are too important to be overlooked.

Sachs in his *History of Botany* treats Phyllotaxy as an exploded error, and gracefully celebrates its obsequies with the parting note that though wrong, it was useful in its day, adding "we would as little wish to omit it from our literature as modern astronomy would wish to see the old theory of epicycles disappear from its history." But what he and others condemned was an artificial or idealistic law imposed on plants in mathematical drapery; the twists that will naturally result from pressure upon young parts or from peculiarities of direction and of amount of nutriment, and from the modifying influence of light or climbing habits, are conceptions that were unknown to the fathers of mathematical phyllotaxy. From inattention to these considerations our botanists often miss what ought to be plain enough. Thus among the cryptogams Sachs gives us spores of *Equisetum* with a wrong spirality for their elaters (I confess my own sin here). Dodel-part gives oögonium of *Chara* wrong twisted; Engler and Prantl seem to require amendment as to *Erodium* (3: 4. 2) and as to *Halicteres* (3: 6. 93); and such instances may be multiplied.

Homodromic spiralism is not infrequent in phenogamic as well as in cryptogamic plants; as the dextrorse twining of some Leguminosae, of Convolvulaceae (including the Dodders) and of *Celastrus;* and other species are sinistrorse. Whilst it was shown in the paper on Antidromy that the mode of bursting of the car-

pels of Balsam is antidromic, in harmony with the phyllotaxy, we find that the carpellary "beaks" of *Geranium*, *Pelargonium* and *Erodium*, of the same natural order with Balsam, are all dextrorsely twisted. In these cases all the individuals of a species, or even of a suborder or order of plants, have the same kind of spiralism. But the leaves of all these are antidromic.

As a contrast to this we sometimes find a quasi-antidromy within the same plant, or even in the same carpel. Thus *Hibiscus* has the corollas of flowers on opposite sides of the same branch slightly contorted in contrary directions. The pod of the *Lotus corniculatus* and other Leguminosae bursts open through the forcible curving of its valves into antidromic spirals. The same occurs in *Foosia* of Rubiaceae (figure in Engler and Prantl, 4: 4. 46), and in the opening with a spring of the cocci of *Ricinus*. (A branch of this in fruit if left over night on a table may next morning have all its cocci opened and its seeds scattered about). Doubtless this is the dehiscing mechanism of the sandbox fruit of *Hura*.

The awns of Gramineae usually have secondary twists of functional significancy. In *Anthoxanthum* a brown dextrally twisted base is surmounted by a pale straight seta; in *Danthonia*, *Stipa*, etc., the base is a brown ribbon dextrally twisted, and this is surmounted by a rigid sinistrorse style. On the application of water the basal ribbon straightens out, causing the style to screw its way into the soil, into the wool of a sheep, or into the clothing and skin of man (witness Captain Cook's Crew in Australia in 1770). This kind of double twist may be termed *didromic* (as suggested by my colleague, Prof. Brackett). It is found in the setæ of some mosses (as figured by Sullivant, *Icones muscorum*, supplement), for example, *Funaria Americana*, *Pottiariparia*, *Rhynchostegium;* or some species of the mosses have the upper part of the seta dextrorsely, and others have it sinistrorsely twisted; but we do not see the significance of these peculiarities.

Charles Darwin showed that in some instances this didromic spirality is a physical necessity, as where tendrils must be shortened and yet their extremities are not to be rotated. This is the sort of spiral made by the cord-like scape of *Vallisneria spiralis*, so pulling down the fertilized carpel without having to

turn it round; and I find that in some plants of this species the upper section is dextrorsely spiral, and the lower section sinistrorsely, whilst in other plants these relations are reversed. Thus we have didromy within each plant of *Vallisneria* and antidromy between neighboring plants.

It would be dangerous at this stage to attempt generalizations as to the cyptogams. I may be permitted, however, to call attention to a few points. In the Atlases of Vegetable Palaeontology, by Schimper, Zeiler, Lesquereux and others, some of the figures of Carboniferous Acrogens, as Lepidodendron, Ulodendron, cones of Lepidostrobus, indicate a trend to one side which would indicate antidromy if others be found trending to the other side. The photograph of *Lepidodendron lycopodioides* in Plate LXX. of Zeiler's Atlas, does give a contrary spiral to that in Schimper's plates, but Zeiler's photograph may have been reversed in the process. The segments of apical cells of Hepaticae and Pteridophytes seem to indicate in some cases a direct or 'clock-wise' order of appearance, and in other cases a reverse order; but I do not know whether they may not vary in the same individual plant, or whether, on the other hand, they may not be homodromic in the totality of a species. I have been unable to find any variation of phyllotaxy in *Lycopodium* and allied forms, the great bilateral symmetry of the leafy axis obscuring the traces that might exist. But in two specimens of the tree-fern *Alsophila* the common phyllotaxy of $\frac{2}{5}$ can be made out at the apex of the stem; in both our Princeton specimens the spirality is dextrorse (that is, after the course of the thread of a common screw). If anybody can produce a specimen with sinistrorse phyllotaxy, he will thereby furnish the lacking evidentiary fact, and complete the proof of the antidromy of the ferns.

Botanical Notes.

Two new botanical Serials. One of our esteemed contemporaries has recently expressed some irritation on learning of the founding of a new serial publication. The number of opportunities for the publication of botanical papers is indeed great, but the supply of matter evidently exceeds the space provided, for we

very seldom learn that any journal has suspended printing, and most of them have had such pressure brought upon their space that they have been obliged to increase their number of pages. The "Journal of Botany" is indeed an exception to the general rule, having continued about the same annual dimensions for a long time.

The new channels of publication are both German. The Berlin Botanical Garden began in January to issue its "Notizblatt des Königlichen botanischen Gartens und Museums zu Berlin," proposing to distribute it at irregular intervals as matter becomes available. The first number bears date January 2d, the second June 5th. They contain much interesting information on species grown in the Garden, on additions to the Museum, and numerous descriptions of new species in the Herbarium contributed by Engler, Urban, Gurke, Schumann and Gilg.

The "Allgemeine botanische Zeitschrift, für Systematik, Floristik, Pflanzengeographie, etc.," was also commenced in January and is published monthly at Karlsruhe, under the editorship of A. Kneucker. It is a general botanical journal, containing besides original communications, reviews, notes on literature and on institutions, societies, exsiccatae and explorations. N. L. B.

Compound Leaves in Rubus odoratus. The leaves of this species are always described as simple. A student of mine, Mr. Millett Thomson, has just shown me, from a plant in his garden, that the leaf with its long petiole first falls, leaving a short stub or main petiole behind, which is itself later deciduous. This, it will be recalled, is something like what happens in the Japanese Ampelopsis, except that there the leaf is sessile on a long petiole, which falls after the blade itself has separated. Both of these plants then have unifoliolate leaves. W. WHITMAN BAILEY.

Sisymbrium altissimum Linn. in Minnesota. Mr. L. H. Dewey has called attention, in a recent number of the BULLETIN, to the occurrence of *Sisymbrium altissimum* Linn. in the side streets of Minneapolis.

This plant has been previously reported from Minnesota localities. The Minneapolis Daily Tribune of September 22, 1894, contains an account of my discovery of this species near Minne-

apolis. Since the first introduction of a few straggling specimens, the plant has spread so as to become a nuisance in the elevator districts on the outskirts of Minneapolis and St. Paul. Specimens have been found also in several other localities in Hennepin, Ramsey and Dakota counties. EDMUND P. SHELDON.

MINNEAPOLIS, MINN., Nov. 12, 1895.

I found this plant in considerable quantities along the railroad at Port Arthur, Lake Superior, in September, 1889. We also have a specimen of it collected at Danville, Quebec, in 1894.

N. L. BRITTON.

Reviews.

Synoptical Flora of North America: Vol. I. Part I. Fascicle I. Polypetalae from the Ranunculaceae to the Frankeniaceae. By Asa Gray, LL. D., and Sereno Watson, Ph. D., continued and edited by Benjamin Lincoln Robinson, Ph. D. (Issued October 10, 1895.)

The second volume of this work was published some years since, in two parts, the first part appearing in the year 1884, while the second was issued in 1878. In 1886 a revised edition of these two parts with an appendix of additions and corrections was issued by the Smithsonian Institution. The first fascicle of part I., volume I., has now been issued from the University press at Cambridge after a lapse of eleven years. Dr. Robinson is to be congratulated on the completion of the pages under consideration and we are promised a second fascicle in the near future. The bulk of the matter was written by Dr. Gray; Dr. Watson subsequently took up the work and continued it until his death; since then Dr. Robinson has completed parts left unfinished by the other authors, besides editing their manuscripts by bringing together facts of recent discovery, mostly in the form of foot-notes.

The pages contain a vast amount of useful and valuable information and the book will be welcomed by everyone. Together with the many good qualities of this issue appear the same faults that characterize the second volume. After a general key to the families, the Ranunculaceae are taken up, and other families fol-

low on the old Candollean sequence to Frankeniaceae inclusive. It is to be regretted that so great a work must be continued on a system of classification which has proved itself inadequate. The want of system in the matter of nomenclature is also to be regretted, for here, as in the former parts, sentiment is the predominating guide in place of rule.

The generic limits as a rule are well taken; some genera, however, are too composite according to modern ideas. The interpretation of species is in many cases not as good as our present knowledge would permit. In *Clematis*, *C. Addisonii* is taken up in its proper place, but *C. viornioides*, a very distinct form, if not a good species, is merely hinted at. *Clematis ovata* is reduced to *C. ochroleuca*, a position not warranted by the abundant specimens of recent collection. The author, following Coulter, has reduced *Clematis Scottii* to a variety of *C. Douglasii;* to be consistent why not reduce *C. Catesbiana* to a variety or state of *C. Virginiana?* In *Ranunculus* we find *R. Allegheniensis* Britton inserted as a species, while *R. micranthus* Nutt. stands as a variety of *R. abortivus* L. In *Aquilegia*, *A. saximontana* Rydberg is published for the first time and well distinguished from the related *A. brevistyla* Hook. Very scant courtesy is paid to *A. Canadensis flaviflora*, but almost immediately following we find *A. caerulea* var. *albiflora* A. Gray, described as a new variety (while there are at least two published available specific names for it), and its characters as given separate it from the type in only just the same degree that differentiates *flaviflora* from *Canadensis*. We can only assume that the editor holds a color variety proposed by Gray to be valid, while rejecting one maintained by others. On page 76, *Nymphaea odorata* var. *minor* appears in the old stereotyped form. Why should this state be called a variety when it is the original of the species *odorata?* If a variety must be maintained it should be done in a consistent way. Little recognition is given an apparently distinct species of *Castalia* from Florida and adjoining territory. The editor says "this form has been confidently identified with *N. reniformis* Walt. by the collector, . . . a disposition in no sense warranted by the brief and wholly dubious characterization of Walter's species." If there were nothing but Walter's description to support Mr. Nash's position, it certainly would be weak, but

careful field observations, morphological characters separating the form from related species, and the fact that the plant is very common in Walter's region, furnish pretty strong evidence in favor of its correct identification. So other cases might be cited. The geographic ranges of many species as given are too restricted, as a few appended examples will show, and no data bearing on altitudinal distribution are furnished.

Clematis Viorna. Common east of the mountains as far south as middle Georgia.

Clematis Addisonii. Also in the Cumberland Mountains, Tennessee.

Clematis Douglasii Scottii. Also in Montana and Dakota.

Clematis verticillata. Occurs in southwestern Virginia.

Clematis alpina tenuiloba. Also in Colorado.

Thalictrum coriaceum. Also in the Cumberland Mountains, Tennessee.

Myosurus minimus. Occurs in southeastern Virginia.

Ranunculus recurvatus. Also in Montana.

Ranunculus abortivus micranthus. Common south to southern Pennsylvania.

Ranunculus septentrionalis. West to Nebraska.

Caltha palustris. Also west to Nebraska.

Aconitum Columbianum. East to the Black Hills, South Dakota.

Cimicifuga racemosa cordifolia. Occurs in the mountains of Virginia.

Xanthorrhiza apiifolia. Ranges east of the mountains and as far south as middle Georgia.

Delphinium tricorne. Occurs as far west as Nebraska.

Delphinium exaltatum. Also west to Nebraska.

Magnolia tripetala. Grows as far south as middle Georgia.

Asimina triloba. Occurs east to New Jersey and west to Nebraska.

Asimina angustifolia. Rather common as far north as middle Georgia.

Brasenia Schreberi. Also south to Georgia and Florida.

Menispermum Canadense. Occurs west to Nebraska.

Berberis repens. Ranges east to the Black Hills, South Dakota.

Argemone alba. Grows in southwestern South Dakota.

Dicentra Canadensis. Occurs in Nebraska.

Corydalis curvisiliqua. East to Louisiana and Florida, also north to Nebraska.

Corydalis aurea occidentalis. Common in Nebraska.

Arabis dentata. Occurs west to Nebraska.

Arabis laevigata. Also south to middle Georgia and west to the Black Hills, South Dakota.

Arabis Holboellii. Ranges east to Nebraska.

Lesquerella Ludoviciana arenosa. Occurs in the Black Hills, South Dakota.

Physaria didymocarpa. Grows in Nebraska.

Nasturtium sessiliflorum. Ranges west to Nebraska.

Cristatella Jamesii. Common in western and central Nebraska.

Cleome lutea. East to Nebraska.

Cleomella angustifolia. Also in Colorado and Nebraska.

Viola palustris Occurs in the Black Hills, South Dakota.

More or less inconsistency in the treatment of families is apparent; compare, for an example, the Ranunculaceae with the Cruciferae; in the former the genera are treated as collectives, while in the latter they appear as segregates and are naturally much clearer. We are pleased to note that the Cruciferae is the best described family in the fascicle.

The book has very few typographical errors, but the often copious foot-notes spoil the appearance of the pages. The matter contained in these notes might better have been incorporated in the text. A curious statement occurs on page 42, where we are told that *Eranthis hyemalis* is "a relict of former cultivation." On pape 191, Table Mountain is given as the locality for *Hudsonia montana.* Table Rock is meant, as Table Mountain is not in North Carolina, but in South Carolina and is a very different place. Dr. Gray confused these two names many years ago and botanists seem to have been unable to get them right since.

J. K. Small.

Our Edible Toadstools and Mushrooms and How to Distinguish Them is the title of a volume recently issued by the well-known firm, Harper & Brothers, New York. The author is W. Hamilton Gibson, who has for a long time given special attention to the

subject here set forth. Previous American booklets, reports, etc., bearing on this subject have been less extensive, complete and satisfactory, yet they have been, as it were, skirmish lines that have made this one possible. It contains 337 pages, and, according to the title page, 30 colored plates and 57 other illustrations The full-page plates are 38. An "Introduction" of 40 pages is no less interesting and important than the body of the work, which is devoted to the descriptions and illustrations of about 30 edible and a half dozen or more poisonous or suspected species. The descriptions are given in a general or popular style, followed in each case by a more condensed and systematized one, but in both all unnecessary technical terms are avoided, inasmuch as the work is especially designed for those who simply desire a better acquaintance with our most common and easily-recognized esculent species, so that they may feel safe in collecting and using them for food. Great care has been taken in placing safeguards around the genus *Amanita* that there might be no danger of an invasion of its dangerous precincts. Indeed, as a concession to the ignorance or carelessnes of such as might otherwise make serious mistakes, this line of safety has confessedly been drawn so rigidly as to exclude from use even some well-known edible species. Nevertheless, the author has done well in showing the worthlessness of many popular rules and tests for discriminating between the good and the bad, and in insisting upon a sufficient knowledge for the recognition of each species to be eaten, save in a few exceptional genera.

The work is enriched by a list of the edible fungi of North Carolina, taken from the catalogue of Rev. M. A. Curtis, by a history of a successful use of atropine, the antidote of amanitine, in a case of dangerous mushroom poisoning, by a series of thirty-four recipes for preparing, cooking or preserving mushrooms, and by three pages of bibliography pertaining to the subject. Marginal indices and a general index at the end of the volume facilitate reference to any subject.

In a work so full of good things and so generally accurate and reliable as this is, one feels like uttering only words of praise and commendation and passing in silence the very few mistakes that might by a critical mind be taken as blemishes. Happily those

that have met my notice are so few and of such a character as not to interfere at all seriously with the design and usefulness of the work, and perhaps would scarcely be noticed by any one except a close student of mycology. Such a one might say there was some mistake in the rather sweeping assertion in the description of *Russula virescens*, that "a faint fluting of the edge" is "a peculiarity of all the Russulæ;" and also that there must be some error in describing the spores of *Boletus alveolatus* in one place as "rose-colored" and in another as "yellowish-brown." There is also quite a discrepancy between the characters assigned in this work to *Clavaria formosa* and *Lycoperdon saccatum* and those found in European works, so that I suspect some misconception of these species, but I do not see how these mistakes can lead the mycophogist into any serious danger.

The publishers have evidently done their part toward making the book attractive. Plates, press work and paper are all good.

We believe that this very useful and creditable volume will be the means of giving a renewed and stronger impulse to American mycology, and that those who are fortunate enough to obtain it will soon be demanding the means of obtaining a knowledge of other species which will attract their notice and which are no less desirable and available for food than those here described.

CHARLES H. PECK.

Proceedings of the Club.

WEDNESDAY EVENING, OCTOBER 30TH, 1894.

The President in the chair and 34 persons present.

The committee on admissions reported favorably on the nominations of Miss Annie E. Hamilton, Mrs. Archibald D. Russell, Dr. F. C. Stewart and Mrs. Theron G. Strong, and they were elected active members, the Secretary being directed to cast an affirmative ballot.

The following announced papers were then presented:

"Notes on the Morphology of the Leaves in *Galium*," illustrated by specimens and drawings, by Mr. A. A. Tyler.

"Remarks on the Luminous Moss, *Schistostega osmundacea*," illustrated by specimens and drawings, by Elizabeth G. Britton.

"Some adaptive structural Features in the Lichens," illustrated by specimens and drawings, by Dr. Albert Schneider. (To be published in the December BULLETIN.)

TUESDAY EVENING, NOVEMBER 12TH, 1895.

Vice-President Lighthipe in the chair and 37 persons present.

Dr. Britton nominated for active membership Mr. B. Heritage, of Mickleton, Gloucester county, N. J.

Prof. Emily L. Gregory presented a paper on "Theories of the Origin and Nature of the Starch Grain," giving the history of the subject from the work of Naegeli to that of Meyer, who has recently submitted evidence that the substance of the starch grain is truly crystalline and not organized, so that all our theories of the growth of organized substance based upon the starch grain as a type fall, and we must begin to study the subject *de novo*.

The Secretary exhibited an ear of corn showing some perfect kernels of sugar corn distributed among those of yellow flint, as well as many kernels of an intermediate character.

Mr. E. S. Miller remarked upon the blooming of certain Cactaceae in cultivation, notably *Cereus Thurberi*, the plant being only a foot or two high and the flowers very small.

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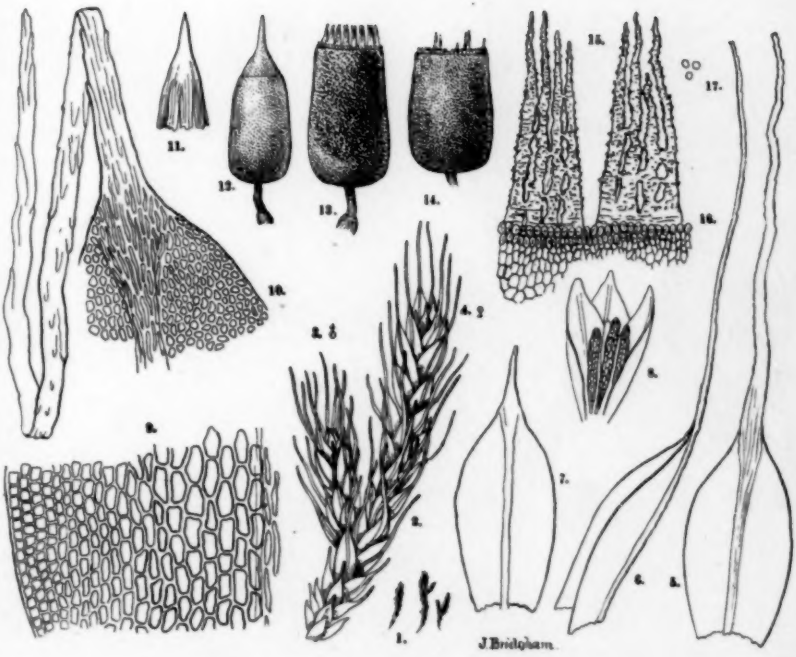

COSCINODON RAUI AUSTIN.

MOUNTAIN FORM OF DICRANELLA HETEROMALLA.